

AMENDMENTS TO THE CLAIMS

Claims 1-2 (cancelled)

Claim 3 (currently amended): [[The]] A droplet ejecting apparatus according to claim 2,
comprising:

a channel unit having a plurality of pressure chambers which communicate, at respective
first ends thereof, with a liquid supply manifold so as to be supplied with a liquid by
the liquid supply manifold and, at respective second ends thereof, with respective
nozzles so as to eject respective droplets of the liquid through the respective nozzles;
and

an actuator unit fixed to the channel unit;

wherein the actuator unit has a plurality of groups of active portions each group of which
includes two active portions which are opposed in a first direction to a corresponding
one of the plurality of pressure chambers, at respective different positions in a second
direction perpendicular to the first direction;

wherein each of the two active portions of said each group includes a piezoelectric sheet,
and a first electrode and a second electrode which are opposed to each other in a
direction of thickness of the piezoelectric sheet that is parallel to the first direction,
such that the first and second electrodes cooperate with each other to sandwich the
piezoelectric sheet;

wherein when an electric voltage is applied across the first and second electrodes of said
each of the two active portions of said each group, the two active portions are
deformed to change a volume of said corresponding pressure chamber;

wherein the respective piezoelectric sheets of the two active portions of said each group
comprise respective portions of a common piezoelectric sheet which additionally

includes an intermediate portion continuous with said respective portions in a direction in which the two active portions are distant from each other, and the respective portions of the common piezoelectric sheet are polarized in a direction of thickness of the common piezoelectric sheet, and wherein when an electric field is applied to the respective portions of the common piezoelectric sheet in a same direction as the direction of polarization thereof, the two active portions are elongated in the direction of thickness of the common piezoelectric sheet; and
~~wherein said each group comprises two active portions, and~~ wherein a distance between the two active portions of said each group is selected at a value which assures that, when the two active portions are elongated in the direction of thickness of the common piezoelectric sheet, ~~[[an]]~~ the intermediate portion of the common piezoelectric sheet that is located between the two active portions is elongated in a same direction as the direction of elongation of the two active portions.

Claim 4 (previously presented): The apparatus according to claim 3,
wherein said intermediate portion of the common piezoelectric sheet that is located between the two active portions of said each group is elongated in the same direction as the direction of elongation of the two active portions, by not less than 90% of an amount of elongation of each of the two active portions.

Claim 5 (cancelled)

Claim 6 (currently amended): ~~[[The]]~~ A droplet ejecting apparatus according to claim 5,
comprising:

a channel unit having a plurality of elongate pressure chambers which communicate, at respective first ends thereof, with a liquid supply manifold so as to be supplied with a liquid by the liquid supply manifold and, at respective second ends thereof, with

respective nozzles so as to eject respective droplets of the liquid through the
respective nozzles; and
an actuator unit fixed to the channel unit;
wherein the actuator unit has a plurality of groups of active portions each group of which
includes two active portions which are opposed in a first direction to a corresponding
one of the plurality of elongated pressure chambers, at respective different positions
in a second direction perpendicular to the first direction;
wherein each of the two active portions of said each group includes a piezoelectric sheet,
and a first electrode and a second electrode which are opposed to each other in a
direction of thickness of the piezoelectric sheet that is parallel to the first direction,
such that the first and second electrodes cooperate with each other to sandwich the
piezoelectric sheet;
wherein when an electric voltage is applied across the first and second electrodes of said
each of the two active portions of said each group, the at least two active portions are
deformed to change a volume of said corresponding elongate pressure chamber;
wherein an outer end portion of at least one of the two active portions of said each group
that are opposed to the corresponding elongate pressure chamber is located at a
position corresponding to a vicinity of an end portion of the corresponding elongate
pressure chamber; and
~~wherein the corresponding pressure chamber comprises an elongate pressure chamber,~~
~~and the two active portions of said each group comprises two active portions that are~~
distant from each other by a predetermined distance in a lengthwise direction of the
corresponding elongate pressure chamber, and wherein an outer end portion of at
least one of the two active portions is located at a position inwardly distant from at
least one of lengthwise opposite ends of the corresponding elongate pressure chamber
by not more than 50% of said predetermined distance.

Claim 7 (currently amended): [[The]] A droplet ejecting apparatus according to claim 1,
comprising:

a channel unit having a plurality of pressure chambers which communicate, at respective first ends thereof, with a liquid supply manifold so as to be supplied with a liquid by the liquid supply manifold and, at respective second ends thereof, with respective nozzles so as to eject respective droplets of the liquid through the respective nozzles;
and

an actuator unit fixed to the channel unit;

wherein the actuator unit has a plurality of groups of active portions each group of which includes at least two active portions which are opposed in a first direction to a corresponding one of the plurality of elongated pressure chambers, at respective different positions in a second direction perpendicular to the first direction;

wherein each of the at least two active portions of said each group includes a piezoelectric sheet, and a first electrode and a second electrode which are opposed to each other in a direction of thickness of the piezoelectric sheet that is parallel to the first direction, such that the first and second electrodes cooperate with each other to sandwich the piezoelectric sheet;

wherein when an electric voltage is applied across the first and second electrodes of said each of the at least two active portions of said each group, the at least two active portions are deformed to change a volume of said corresponding pressure chamber;
and

wherein a ratio of a sum of respective areas of the at least two active portions of said each group to an area equal to a product of a length of the corresponding pressure chamber and a width of said each of the at least two active portions as measured in a direction perpendicular to a lengthwise direction of the corresponding pressure chamber is not smaller than 0.7 and smaller than 1.

Claims 8-11 (cancelled)

Claim 12 (currently amended): The apparatus according to claim [[1]] 3,

wherein the liquid supply manifold comprises an ink supply manifold which supplies an ink as the liquid, and wherein the actuator unit changes a volume of each of the pressure chambers of the channel unit, so as to eject, from a corresponding one of the nozzles, a droplet of the ink as the droplet of the liquid and thereby form an image on a recording medium.

Claim 13 (currently amended): A droplet ejecting apparatus, comprising:

a channel unit having a plurality of elongate pressure chambers which ~~communicates~~ communicate, at respective first ends thereof, with a liquid supply manifold so as to be supplied with a liquid by the liquid supply manifold and, at respective second ends thereof, with respective nozzles so as to eject respective droplets of the liquid through the respective nozzles; and

an actuator unit fixed to the channel unit,

wherein the actuator unit has a plurality of groups of elongate active portions each group of which includes at least two elongate active portions which are opposed in a first direction to a corresponding one of the plurality of elongate pressure chambers, at respective different positions in a second direction perpendicular to the first direction,

wherein each of said at least two elongate active portions of said each group includes a piezoelectric sheet, and a first electrode and a second electrode which are opposed to each other in a direction of thickness of the piezoelectric sheet that is parallel to the first direction, such that the first and second electrodes cooperate with each other to sandwich the piezoelectric sheet,

wherein when an electric voltage is applied across the first and second electrodes of said each of the at least two elongate active portions of said each group, the at least two

elongate active portions are deformed to change a volume of said corresponding elongate pressure chamber, and
wherein a first ratio of a sum of respective lengths of the at least two elongate active portions of said each group to a length of the corresponding elongate pressure chamber is not smaller than 0.7 and smaller than 1.

Claim 14 (currently amended): [[The]] A droplet ejecting apparatus according to claim 1,
comprising:

a channel unit having a plurality of pressure chambers which communicate, at respective first ends thereof, with a liquid supply manifold so as to be supplied with a liquid by the liquid supply manifold and, at respective second ends thereof, with respective nozzles so as to eject respective droplets of the liquid through the respective nozzles;
and

an actuator unit fixed to the channel unit;

wherein the actuator unit has a plurality of groups of active portions each group of which includes at least two active portions which are opposed in a first direction to a corresponding one of the plurality of pressure chambers, at respective different positions in a second direction perpendicular to the first direction;

wherein each of said at least two active portions of said each group includes a piezoelectric sheet, and a first electrode and a second electrode which are opposed to each other in a direction of thickness of the piezoelectric sheet that is parallel to the first direction, such that the first and second electrodes cooperate with each other to sandwich the piezoelectric sheet;

wherein when an electric voltage is applied across the first and second electrodes of said each of the at least two active portions of said each group, the at least two active portions are deformed to change a volume of said corresponding pressure chamber;
and

wherein the apparatus further comprising comprises a driver circuit which drives the actuator unit in a single driving mode in which the driver circuit thoroughly simultaneously applies respective equal electric voltages to said at least two active portions of an arbitrary one of the plurality of groups so as to thoroughly simultaneously deform said at least two active portions and thereby change the volume of said corresponding pressure chamber, and which does not drive the actuator unit in any modes different from said single driving mode.

Claim 15 (currently amended): The apparatus according to claim [[2]] 3, wherein the common piezoelectric sheet is commonly opposed in the first direction to respective entire areas of the plurality of pressure chambers.

Claim 16 (previously presented): The apparatus according to claim 7, wherein said ratio is smaller than 0.8.

Claims 17-18 (cancelled)

Claim 19 (currently amended): The apparatus according to claim 13, wherein said first ratio is smaller than 0.8.

Claim 20 (new): The apparatus according to claim 13, wherein the at least two elongate active portions of said each group comprise two elongate active portions which are distant from each other in a lengthwise direction of the corresponding elongate pressure chamber and each of which extends parallel to the corresponding elongate pressure chamber, and wherein the corresponding elongate pressure chamber has a first width, and each of the at least two elongate active portions has a second width smaller than the first width.

Claim 21 (new): The apparatus according to claim 20,
wherein a second ratio of a sum of respective areas of the at least two elongate active
portions to an area equal to a product of the second width of said each elongate active
portion and a length of the corresponding elongate pressure chamber is not smaller
than 0.7 and smaller than 1.

Claim 22 (new): The apparatus according to claim 21,
wherein said second ratio is smaller than 0.8.